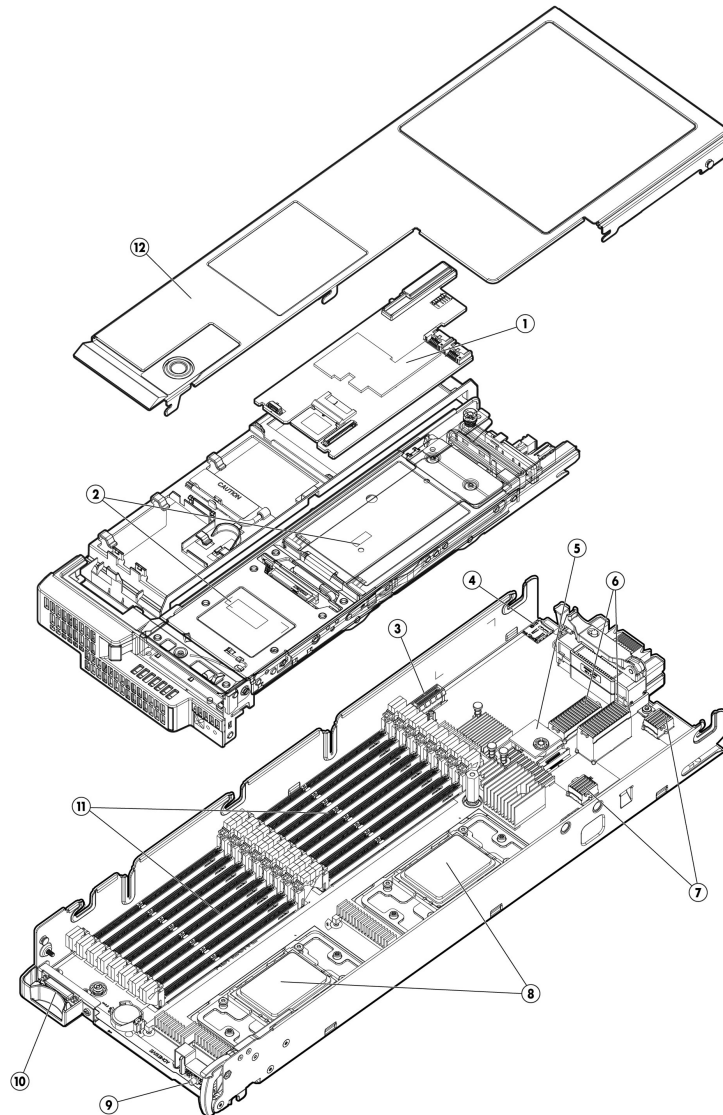## Overview

1. HP Smart Array P220i Controller with 512MB FBWC
2. Two (2) small form factor (SFF) hot plug drive bays
3. Internal USB connector
4. Internal MicroSD card slot
5. TPM connector
6. Two (2) mezzanine I/O expansion slots
7. FlexibleLOM connector
8. Up to two (2) Multi-Core AMD Opteron™ 6300 or 6200 Series processors
9. System power button and LED
10. Local I/O connector
11. Sixteen (16) DDR3 DIMM memory slots (8 per processor)
12. Access panel

What's New

- Support for 6G SATA Solid State drives

Standard Features

NOTE: This document covers the HP ProLiant BL465c Gen8 server blade only. For information on HP BladeSystems c-Class Enclosures and HP BladeSystem c-Class Interconnect and Mezzanine Components, please see the following:

HP BladeSystem c-Class Enclosures QuickSpecs:

- HP BladeSystem c3000 Enclosure QuickSpecs at
  http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html
  NOTE: The c3000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c7000 Enclosure QuickSpecs at
  http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html
  NOTE: The c7000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c-Class Interconnect and Mezzanine Components at
  http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html
  http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html

NOTE: For proper BladeSystem operation, the minimum required versions of HP Onboard Administrator and HP Virtual Connect are required and available via the HP Service Pack for ProLiant, please see: http://www.hp.com/go/spp/download.

NOTE: For the Standard Features shipped in the "Factory Integrated Models", please see the "Configuration Information - Factory Integrated Models" section.

Processor	
One of the following depending on Model	**Sixteen-Core Processors**
	AMD Opteron™ 6380 (2.5GHz/ 16-core/16MB/115W) Processor
	AMD Opteron™ 6378 (2.4GHz 16-core/16MB/115W) Processor
	AMD Opteron™ 6376 (2.3GHz 16-core/16MB/115W) Processor
	Low Power AMD Opteron™ 6366HE (1.8GHz/16-core/16MB/85W) Processor
	AMD Opteron™ 6278 (2.4GHz/16-core/16MB/115W) Processor
	AMD Opteron™ 6276 (2.3GHz/16-core/16MB/115W) Processor
	AMD Opteron™ 6274 (2.2GHz/16-core/16MB/115W) Processor
	AMD Opteron™ 6272 (2.1GHz/16-core/16MB/115W) Processor
	Low Power AMD Opteron™ 6262HE (1.6GHz/16-core/16MB/85W) Processor
	Twelve-Core Processors
	AMD Opteron™ 6348 (2.8GHz/12-core/16MB/115W) Processor
	AMD Opteron™ 6344 (2.6GHz/ 12-core/ 16MB/115W) Processor
	AMD Opteron™ 6238 (2.6GHz/12-core/16MB/115W) Processor
	AMD Opteron™ 6234 (2.4GHz/12-core/16MB/115W) Processor
	Eight-Core Processors
	AMD Opteron™ 6328 (3.2GHz/8-core/16MB/115W) Processor
	AMD Opteron™ 6320 (2.8GHz/8-core/16MB/115W) Processor
	AMD Opteron™ 6220 (3.0GHz/8-core/16MB/115W) Processor
	AMD Opteron™ 6212 (2.6GHz/8-core/16MB/115W) Processor
	Quad-Core Processors

Standard Features

AMD Opteron™ 6308 (3.5GHz/4-core/16MB/115W) Processor

AMD Opteron™ 6204 (3.3GHz/4-core/16MB/115W) Processor

NOTE: Processor wattage references reflect Thermal Design Power (TDP). For more information on TDP and Average CPU Power (ACP) visit: http://www.amd.com/acp.

Cache Memory	16MB Level 3 cache memory

Chipset	AMD SR5690 and SP5100
	NOTE: For more information regarding AMD chipsets, please see the following: http://www.amd.com/us/products/Pages/chipsets.aspx.

Upgradeability	Upgradeable to two (2) processors

On System Management Chipset	HP iLO (Firmware: HP iLO 4)
	NOTE: For more information, visit: http://www.hp.com/go/ilo

Memory Protection	Advanced ECC
	Online spare mode

Memory	Type	HP SmartMemory
		DDR3 Load Reduced (LRDIMM) or Registered (RDIMM)
	Standard (Pre-configured Models)	16GB (2 x 8 GB) DDR3 1333MHz RDIMMs at 1.35v
	Maximum (LRDIMM)	512GB (16 x 32GB) at 1333MHz
	Maximum (RDIMM)	256GB (16 x 16GB) up to 1600MHz

NOTE: HP memory from previous generation servers are not qualified or warranted with this server. HP SmartMemory is required to realize the memory performance improvements and enhanced functionality listed in this document for Gen8. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html.

NOTE: LRDIMM, RDIMM and UDIMMs are all distinct memory technologies and cannot be mixed within a server. The majority of ProLiant Gen8 servers support RDIMM, UDIMM and LRDIMM.

NOTE: Depending on the memory configuration and processor model, the memory speed may run at 1600MHz, 1333MHz, or 1066MHz. Please see Memory Population Table or the Online Memory Configuration Tool at: www.hp.com/go/ddr3memory-configurator.

Standard Features

Network Controller	**NOTE:** Supports one of the following FlexibleLOMs and iLO Management.

One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
NOTE: Supports FCoE, Flex-10, TCP/IP offload engine, hardware-based accelerated iSCSI, iSCSI boot, and autosensing 10Gb/1Gb Ethernet.
NOTE: Each port is autosensing 1Gb/10Gb, and can interoperate with 1Gb HP BladeSystem c-Class interconnect components. Both ports will operate at the same speed.
NOTE: FlexFabric capabilities require the use of an HP Virtual Connect FlexFabric module. Fibre Channel over Ethernet (FCoE) is supported with the HP 10GbE Pass-Thru Module, HP 6120XG Blade Switch with the CEE license installed, HP Cisco B22HP Fabric Extender and HP Cisco B22HP Fabric Extender with 16 FET for BladeSystem c-Class. Learn more at www.hp.com/go/virtualconnect.
One (1) HP Flex-10 10Gb 2-port 530FLB FlexibleLOM
One (1) HP Ethernet 10Gb 2-port 560FLB FlexibleLOM
NOTE: FlexibleLOMs are not compatible with prior generation c-Class server blades
Standard iLO Network Controller:
One (1) 10/100 Mbps port for the HP iLO 4 On System Management Chipset
One (1) 10/100 Mbps port for the HP iLO 4 to Onboard Administrator link. The Onboard Administrator (with 10/100/1000 Mbps) to BladeSystem link is 1Gbps.

Expansion Slots

Two (2) I/O expansion mezzanine slots:

- x8 PCIe 2.0 Type A (supports Type A mezzanine cards) (expansion slot 1).
  NOTE: This expansion slot supports dual-port mezzanine cards: one port is routed to interconnect module bay 3 and the other to bay 4.
- x16 PCIe 2.0 Type B (supports Type A and Type B mezzanine cards (expansion slot 2).
  NOTE: This expansion slot supports dual-port and quad-port mezzanine cards. For dual-port cards, one port is routed to interconnect module bay 5 and the other to bay 6. For quad-port cards, one port is routed to interconnect module bay 5, one to bay 6, one to bay 7, and one to bay 8.

Mezzanine card options include:

- Dual-port 10Gb FlexFabric,10Gb Flex-10, 10GbE options, and quad-port 1Gb Ethernet server adapter mezzanine options for additional network ports
- Dual-port 8Gb Fibre Channel HBA for SAN connectivity
- QDR and FDR InfiniBand for low latency and high bandwidth server interconnectivity
- I/O accelerator mezzanine options for high transaction rate local storage
- Smart Array SAS RAID controller mezzanine options for external direct attach and shared SAS storage

Standard Features

HP Server ROM		HP ROM (read only memory) is now digitally signed using HP's Corporate Signing Service. This signature is verified before the flash process starts, reducing accidental programming and preventing malicious efforts to corrupt system ROM.

HP ROM provides for essential initialization and validation of hardware components before control is passed to the customer-installed operating system. The ROM also provides the capability of booting from various fixed media (HDD, CD-ROM) and removable media (USB), to continue operation to the operating system.

HP ROM performs very early configuration of the video controller, to allow monitoring of initialization progress via an attached monitor. If configuration or hardware errors are discovered during this early phase of hardware initialization, suitable messages are now displayed on the connected monitor. Additionally, these configuration or hardware errors are logged to the Integrated Management Log (IML) to assist in diagnosis.

HP's ProLiant ROM is used to configure the following:

- Processor and chipset status registers
- System memory, memory map, and memory initialization
- System hardware configuration (integrated PCI devices and optional PCIe cards).
- Customer-specific BIOS configuration using the HP ROM-Based Setup Utility (RBSU).

NOTE: For further information, please refer to HP's RBSU (ROM based setup utility) user guide: www.hp.com/support/rbsu

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Storage Controller	All Models	One (1) HP Smart Array P220i Controller with 512MB FBWC, (RAID 0 and 1) **NOTE:** Upgradeable firmware with recovery ROM. **NOTE:** The HP Smart Array P220i supports two (2) small form factor (SFF) hot plug drive bays. Available Options: Smart Array Advanced Pack Software for enhanced performance, reliability, availability, and security of system data

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Maximum Internal Storage	Hot Plug SFF SAS	2.4TB	2 x 1.2TB
	Hot Plug SFF SATA	2.0TB	2 x 1.0TB
	Hot Plug SFF SAS SSD	1.6TB	2 x 800GB
	Hot Plug SFF SATA SSD	1.6TB	2 x 800GB

NOTE: The ProLiant BL465c Gen8 server includes the new HP small form factor (SFF) hot plug SmartDrive carrier for enhanced management and reduced maintenance errors. HP drives from previous generation servers are not compatible with the ProLiant BL465c Gen8 drive bays.
NOTE: The mixing of standard SAS drives with SAS SSD drives is supported within the server, but limits the RAID configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported.

Standard Features

Interfaces	Micro SDHC Slot	One (1) internal Micro Secure Digital High Capacity (Micro SDHC) card slot
	USB 2.0 Port	One (1) internal USB 2.0 connector for USB flash media drive keys

NOTE: The above options are for integrated hypervisor virtualization environments needing a low cost boot solution with the highest performance and reliability.

Industry Standard Compliance

ACPI 2.0
Microsoft® Logo certifications
USB 2.0 Support
IPMI 2.0
Secure Digital 2.0
TPM 1.2 Support
IEEE (specific IEEE standards dependant on Ethernet adapter card(s) installed)
Advanced Encryption Standard (AES)
Triple Data Encryption Standard (3DES)
SNMP
PCIe 2.0

Operating Systems and Virtualization Software Support for ProLiant Servers

Microsoft Windows Server
Red Hat Enterprise Linux (RHEL)
SUSE Linux Enterprise Server (SLES)
Oracle Solaris
VMware
Citrix XenServer

NOTE: For more information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: http://www.hp.com/go/ossupport and our driver download page http://www.hp.com/support/BL465cGen8

Enclosures

HP offers two different c-Class server blade enclosures to meet your individual needs:

- The HP BladeSystem c7000 rack enclosure is 10U high and holds up to sixteen (16) ProLiant BL465c Gen8 servers plugged vertically.
- The HP BladeSystem c3000 rack enclosure is 6U high and holds up to eight (8) HP ProLiant BL465c Gen8 servers plugged horizontally.
- Server blades, storage blades, interconnect modules, power supplies, fans, and redundant Onboard Administrator modules are all designed to fit into the c3000 and c7000 enclosures.

NOTE: For additional enclosure information, please see:
http://h18004.www1.hp.com/products/blades/components/enclosures/c-class/index.html

QuickSpecs

Standard Features

Graphics	Integrated Matrox G200 video standard

- 1280 x 1024 (32 bpp)
- 1920 x 1200 (16 bpp)

HP iLO 4 On System Management Memory

- 16 MB Flash
- 256 MB DDR 3 with ECC (112 MB after ECC and video)

Form Factor   HP ProLiant BL465c Gen8 is a half-height server blade that plugs into the HP BladeSystem c3000 and c7000 enclosures.

On System Management   HP iLO Management Engine

HP iLO Management Engine is a comprehensive set of embedded management features supporting the complete lifecycle of the server, from initial deployment, through ongoing management, to service alerting and remote support. HP iLO Management Engine comes standard on all HP ProLiant Gen8 servers. The HP iLO Management Engine portfolio includes:

- **HP iLO:** Provides remote embedded server management without OS-based management software
- **HP Agentless Management:** Provides remote embedded server management without OS-based management software
- **HP Active Health System:** Builds diagnostic support into the server.
- **HP Intelligent Provisioning:** Lets customers provision and configure a single server without any separate media. No more SmartStart CDs or Smart Update Firmware DVD are needed.
  - To start Intelligent Provisioning:
    - Press the F10 key during the ProLiant Gen8 server boot process (also known as power on self test or POST).
    - Please go to the Intelligent Provisioning website at www.hp.com/go/intelligentprovisioning for additional information and to view usage videos.
    - Use the Service Pack for ProLiant (SPP) at www.hp.com/go/spp to get firmware and software updates.
    - HP iLO Mobile App: Enables the ability to access, deploy, and manage your server anytime from anywhere from select smartphones and mobile devices. For additional information please visit: www.hp.com/go/ilo/mobileapp

NOTE: For more information, visit: http://www.hp.com/go/ilo or HP iLO Management Engine technologies whitepaper

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Standard Features

HP Insight management software	HP Service Pack for ProLiant	HP Service Pack for ProLiant (SPP) and HP Smart Update Manager (HP SUM) provide a comprehensive approach to firmware and system software maintenance. Together they provide better operating stability and ensure maximum uptime. The SPP will be updated at a predictable cadence, typically coinciding with new HP server hardware launches. By enabling firmware to be updated online and integrating firmware and system software updates in one operation, HP SUM and the SPP offer faster updates of individual servers and dramatically faster updates of entire BladeSystem enclosures. Further improving system uptime and stability is the fact that HP provides 12 months of support for each Service Pack for ProLiant release.

The user experience around HP SUM and the SPP has been improved in several ways, starting with the web download. A single web page provides access to a single download containing both the latest version of HP SUM and the latest SPP. Optional smaller subsets with only specific types of servers or specific operating systems are offered to save on download time. The HP SUM application provides a straightforward, intuitive user interface that guides the user through the steps of discovery, analyses and update, providing comprehensive information on available updates, criticality and interdependencies. This information is also available in reports. By providing the option of multiple local or shared repositories which can be easily updated from hp.com, HP SUM provides the tools to optimize stability and consistency throughout the company. While HP SUM and the SPP recommend the combinations of firmware and system software that HP has found to be the best practice, the application gives customers the flexibility to set their own specific baseline.

The Service Pack for ProLiant has been rigorously tested with specific attention for interaction between firmware, drivers and agents both within the server as well as in interaction with the BladeSystem enclosure components (Onboard Administrator and Virtual Connect). This testing ensures the highest quality as well as providing the input for HP SUM to deploy updates taking into account all interdepencies, when determining the correct updates and order of update deployment.

NOTE: The Service Pack for ProLiant (which includes HP SUM) can be downloaded from www.hp.com/go/spp/download. More information can be found: http://www.hp.com/go/SmartUpdate, www.hp.com/go/spp and http://www.hp.com/go/hpsum

Standard Features

Security
- Power-on password
- Administrator's password
- Keyboard password (QuickLock)
- HP iLO 4 On System Management Chipset with:
  - SSL encryption
  - Secure Shell version 2
  - Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface
  - AES and RC4 encryption of video
- External USB port enable/disable
- Network server mode
- Serial interface control
- TPM (Trusted Platform Module) 1.2 option
- Advanced Encryption Standard (AES)

Availability

Memory

- Advanced ECC uses single device data correction (SDDC) to detect and correct single and all multi-bit error that occurs within a single DRAM chip. Both x4 and x8 SDDC are supported
- Memory online spare mode (also known as rank spare mode) detects a rank that is degrading and switches operation to the spare rank.
- Memory demand and patrol scrubbing to prevent accumulation of correctable errors and reducing the likelihood of unplanned downtime.
- Failed DIMM isolation improves the service time thus improving the overall system availability.
- Address parity protection available on RDIMMs and LRDIMMs detects address bit errors improving service time and overall system availability.

Mezzanine options and I/O

- FlexibleLOM connector supporting two (i.e. redundant) Ethernet ports.
- Multiple mezzanine I/O expansion slots that support a wide variety of mezzanine cards each supporting multiple data paths routed to redundant interconnect modules.
- Network Adapter Teaming (bonding) provides network fault tolerance, transmit load balancing, and switch-assisted load balancing.

Storage

- Two (2) Small Form Factor hot-plug SAS/SATA/SSD drive bays.
- Integrated HP Smart Array P220i Controller with 512MB FBWC, RAID 0 and 1 support, and upgradeable firmware with recovery ROM capability.
- Optional HP D2200sb Storage Blade for direct attached and shared storage within the c-Class enclosure.
- Optional dual-port Fibre Channel mezzanine cards for redundant SAN connections.

Processor/Chipset

- Processor internal sensors & thermal control protection against over-temperature conditions.
- Cache parity/ECC protects cache data from accidental data corruption.
- Machine Check Architecture (MCA) detects and captures hardware errors such as system bus, memory ECC, parity, and cache, and improves service time.

Standard Features

Server Blade Enclosure Infrastructure

- Pooled power for true N+N power redundancy through up to six (6) hot-plug, high-efficiency, enclosure-based power supplies (configuration dependant).
- Up to ten (10) redundant enclosure-based hot-plug HP Active Cool fans that scale to meet future demands and optimize airflow, reduce power draw, and improve acoustic performance.
- Dual grid power providing redundant rack enclosure power feeds to the server blade enclosure.
- HP Dynamic Power Saver Mode the total enclosure power consumption is monitored in real time and automatically adjusted with changes in demand for improved efficiency and reliability.
- HP Dynamic Power Capping safely limits power usage without impacting performance by capping peak instead of average power usage, removes risk to electrical infrastructure with fast-acting, hardware-based capping algorithm, and reclaims more power by dynamically controlling power limits based on workload demand.
- Up to eight interconnect modules per server blade enclosure providing four simultaneous redundant fabrics for FlexFabric, Virtual Connect Ethernet, Fibre Channel, InfiniBand, iSCSI, etc.
- Enclosure crosslinks between adjacent to provide interconnect module-to-module connections or as Virtual Connect module stacking links.
- Optional enclosure redundant Onboard Administrator system management module.

Warranty

This product is covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. Hardware diagnostic support and repair is available for three years from date of purchase. Support for software and initial setup is available for 90 days from date of purchase. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. Certain restrictions and exclusions apply. Hard drives have either a one year or three year warranty; refer to specific hard drive QuickSpecs for details.

NOTE: Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support. Warranty repairs may be accomplished through the use of Customer Self Repair (CSR) parts. These parts fall into two categories: 1) Mandatory CSR parts are designed for easy replacement. A travel and labor charge will result when customers decline to replace a Mandatory CSR part; 2) Optional CSR parts are also designed for easy replacement but may involve added complexity. Customers may choose to have HP replace Optional CSR parts at no charge. Additional information regarding worldwide limited warranty and technical support is available at http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html.

Optional Features

Fibre Channel Support	Up to two (2) optional Fibre Channel mezzanine HBAs are supported on the HP ProLiant BL465c Gen8.
Compatible SAN	HP ProLiant BL465c Gen8 server blades are optimized for HP MSA, EVA and XP. HP ProLiant BL465c Gen8 server blades are compatible with select 3rd party SANs. Please see blade storage page for more details at http://h18004.www1.hp.com/products/blades/components/c-class-sans.html.
HP Virtual Connect	HP Virtual Connect is an interconnect option for BladeSystem c-Class that simplifies server connectivity to data and storage networks, and reduces costs. Unique HP Flex-10 technology makes maximum use of network bandwidths, provide dynamic tuning and enable extreme flexibility to meet individual server and infrastructure requirements by allocating up to 4 network connections per server port. Virtual Connect FlexFabric modules extend those capabilities to allocate one function per port to storage connections. HP Virtual Connect Enterprise Manager (VCEM) provides server management software with a central console to administer network connections and workloads for thousands of servers. For more information on Virtual Connect Enterprise Manager, see http://www.hp.com/go/vcem. For more information on Virtual Connect Ethernet, Fibre Channel, Converged Network and management options, see http://www.hp.com/go/virtualconnect.

HP Insight management software	HP Insight Control	HP Insight Control, a product option, delivers essential infrastructure management that can help save time and money by making it easy to deploy, migrate, monitor, remote control, and optimize your IT infrastructure through a single, simple management console. For more information, see http://www.hp.com/go/insightcontrol. HP Insight Control includes one year of 24 x 7 HP Software Technical Support and Update Service ensuring rapid access to HP support staff and proactive delivery of software updates. For more information about this service, see: http://www.hp.com/services/insight.
	HP Matrix Operating Environment	The HP Matrix Operating Environment (Matrix OE) for ProLiant and Integrity servers is an integrated command center that helps you instantly adjust to dynamic business demands. This advanced infrastructure management software lets you reduce the cost of common data center tasks by up to 40 percent while keeping pace with your changing business. The HP Matrix OE includes the automated provisioning, optimization, and recovery management capabilities for HP CloudSystem Matrix, the ideal platform for private cloud and Infrastructure as a Service (IaaS). For more information, see http://www.hp.com/go/matrixoe.
	HP iLO Scale-Out	The HP iLO Scale-Out license ideal for web/hosting/cloud service providers and High Performance Computing environments. This license is a specific subset of iLO Advanced functionality, provides fast remote access through Text Console via SSH, lower operational cost with Dynamic power capping, and faster time to resolution through Email-based Alerting and proactive notifications. With this newly designed HP iLO Scale-Out license HPC customers now have a server management package solely design and priced for their massive data environments. HP iLO Scale-Out is available on all HP

Optional Features

		ProLiant Gen8 BL and SL platforms. For more information, see: www.hp.com/go/iLO/scale-out
	HP iLO Advanced	HP Integrated Lights-Out Advanced License a product option, providing smart remote server management without compromise. iLO Advanced unlocks the full set of remote administration functionality for all HP ProLiant servers by activating the full Virtual Keyboard Video and Mouse remote console, multi-user collaboration, console record and replay, GUI-based and scripted virtual media and virtual folders, and enhanced security and power management functionality. For more information, see: http://www.hp.com/go/iloadvance.

HP iLO Advanced License for ProLiant Servers

HP iLO management processors for HP ProLiant Gen8 servers virtualizes system controls to help simplify server setup, engage health monitoring and power and thermal control, and promote remote administration. HP iLO functions out-of-the-box without additional software installation and functions regardless of the servers' state of operation. The HP iLO can be accessed from any location via a web browser and works hand-in-hand with HP Systems Insight Manager, Insight Control, and Matrix Operating Environment, helping customers unleash the value of the ProLiant platform and deliver the highest possible quality of IT service to the business.

Advanced functionality, such as graphical remote console, multi-user collaboration, and video record/playback can be activated with the optional HP iLO Advanced or HP iLO Advanced for BladeSystem licenses. The Advanced licensed features offer sophisticated remote administration of servers in dynamic data center and remote locations and can help significantly reduce cost associated with IT-related travel and unplanned downtime.
NOTE: For more information, visit http://www.hp.com/go/ilo.

HP OneView

The HP OneView architecture combines server, storage, and networking with control of datacenter environmentals into a single, integrated management platform. Architected to deliver lifecycle management for the complete Converged Infrastructure, it facilitates collaboration, removes friction, collapses cycle times, eliminates error-prone work, and accelerates time to value. HP OneView v1.0 combines management of servers and virtual connect with open integration to automate and customize existing tools and processes. With OneView, you'll work smarter-with greater visibility and control-and fully capitalize on the benefits of a Converged Infrastructure.
For more information on HP OneView management, see: http://www.hp.com/go/oneview.

Optional Features

High Performance Clusters	HP Cluster Platforms	HP Cluster Platforms are specifically engineered, factory-integrated large-scale ProLiant clusters optimized for High Performance Computing, with a choice of servers, networks and software. Operating system options include specially priced offerings for Red Hat Enterprise Linux and SUSE Linux Enterprise Server, as well as Microsoft Windows HPC Server. A Cluster Platform Configurator simplifies ordering. http://www.hp.com/go/clusters
	HP HPC Interconnects	High Performance Computing (HPC) interconnect technologies are available for this server as part of the HP Cluster Platform portfolio. These high-speed InfiniBand and Gigabit interconnects are fully supported by HP when integrated within an HP cluster. Flexible, validated solutions can be defined with the help of configuration tools. http://www.hp.com/techservers/clusters/ucp/index.html
	HP Insight Cluster Management Utility	HP Insight Cluster Management Utility (CMU) is an HP-licensed and HP-supported suite of tools that are used for lifecycle management of hyperscale clusters of Linux ProLiant systems. CMU includes software for the centralized provisioning, management and monitoring of nodes. CMU makes the administration of clusters user friendly, efficient, and effective. http://www.hp.com/go/cmu

Storage Software	Whether you need to solve a specific data protection, archiving, or storage command and control challenge, or deliver on strategic consolidation, compliance, or continuity initiatives, look no further than HP storage software. Our storage software helps you reduce costs, simplify storage infrastructure, protect vital assets and respond faster to business opportunities. Storage software that gets the job done:

- Data Protection and Recovery Software
  Whether you're a large enterprise or a smaller business, HP data protection and recovery software will cost-effectively protect you against disaster and ensure business continuity.
- Data Archive and Migration Software
  HP's storage software enables you to comply with data retention and retrieval requirements, improve application performance, and reduce costs by efficiently migrating infrequently accessed or less valuable data to lower cost storage.
- Storage Resource Management Software (SRM)
  HP's storage resource management software reduces operational costs and provides the command and control foundation you need to efficiently manage and visualize your physical and virtual environments.
- Data Replication Software
  HP offers array-based and host-based replication software for use in disaster recovery, testing, application development and reporting.
- Storage Device Management Software
  Maximize your investment in HP storage and networking with software that enables hardware-specific configuration, performance tuning and connectivity management.
- HP StoreVirtual VSA
  With HP StoreVirtual VSA you can use the power of virtualization to turn a set of heterogeneous and disconnected physical disk drives in your servers and storage devices into a single pool of logical storage capacity.

NOTE: For more information available Storage Software including QuickSpecs, please see: www.hp.com/go/storage/software.

Optional Features

HP Insight Online	HP Insight Online is a new addition to the HP Support Center for one stop, secure access to product and HP support information personalized to your IT environment. Insight Online can automatically display devices remotely monitored by HP Insight Remote Support. With Insight Online's easy navigation you can efficiently track your IT support contracts and device status from anywhere and at anytime. http://www.hp.com/go/insightonline
HP Proactive Insight experience	Prevent problems with innovative, automated monitoring tools and proactive services. The HP Proactive Insight experience consist of using Insight Online, Insight Remote Support, and Proactive Care Support Service as one integrated solution. The Proactive Insight experience provides you with expert advice and personalized, cloud-based automated IT support, helping to prevent unplanned down time and solve problems quickly. For more information, visit: www.hp.com/go/proactiveinsightexperience
Expansion Blade Support	Supports one (1) optional storage, tape, or PCI expansion blade.
Factory Express Portfolio for Servers and Storage	HP Factory Express offers configuration, customization, integration and deployment services for HP servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed. Factory Express offers service packages for simple configuration, racking, installation, complex configuration and design services as well as individual factory services, such as image loading, asset tagging, and custom packaging. HP products supported through Factory Express include a wide array of servers and storage: HP Integrity, HP ProLiant, HP ProLiant Server Blades, HP BladeSystem, HP 9000 servers as well as the MSAxxxx, VA7xxx, EVA, XP, rackable tape libraries and configurable network switches. For more information on Factory Express services on your specific server model please contact your sales representative or go to: http://www.hp.com/go/factory-express.html
HP Simple Configurator	SCE is a guided self service tool to help sales and non technical people provide customers with initial configurations in 3 to 5 minutes. You may then send the configuration on for configuration help, or use in your existing ordering processes. If you require "custom" rack configuration or configuration for products not available in SCE, please contact HP's Customer Business Center or an Authorized Partner for assistance. http://www.hp.com/products/configurator

Service and Support

Service and Support	**HP Technology Services for Industry Standard Servers and BladeSystem** Capitalizing on HP ProLiant server and HP BladeSystem capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services. **Protect your business beyond warranty with HP Care Pack Services** HP Care Pack services offer complete care and support expertise with committed response choices designed to meet your IT and business needs. HP Foundation Care services offer scalable reactive support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.

Recommended HP Care Pack Services for your HP product

Optimized Care	**3-Year HP 6 hour Call to Repair Response, Proactive Care** Combined reactive and proactive support for hardware and software helping optimize your systems and delivering high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf **HP Install c-Class Server Blade Service** This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.
Standard Care	**3-Year HP 24x7 4 hour response, Proactive Care Service** This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HP's vast global resources. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf **HP Install c-Class Server Blade Service** This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.

Service and Support

Related Services	**HP Proactive Care Personalized Support - Environmental Option** The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HP Proactive Care Support. **HP Proactive Select Service** Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf **NOTE:** Additional HP Care Pack services can be found at: http://www.hp.com/go/cpc
Insight Online/Insight Remote Support	HP Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HP solution. Learn more about Insight Remote Support http://www.hp.com/go/insightremotesupport and Insight Online http://www.hp.com/go/insightonline **NOTE:** Insight Remote Support is a prerequisite for Proactive Care. All blades within a single HP BladeSystem enclosure must be at the same service level.
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. **NOTE:** HP Support Center Mobile App is subject to local availability.
Parts and Materials	HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction.
For more information	To learn more on HP ProLiant servers and HP BladeSystem servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: www.hp.com/services/bladesystem

Models

HP ProLiant BL465c Gen8 6380 1P 16GB-R P220i Server 699045-B21	**Processor(s)**	(1) AMD Opteron™ 6380 (2.5GHz/16-core/16MB/115W) Processor
	Cache Memory	16MB Level 3 cache memory
	Memory	16GB (2 x 8 GB) DDR3 1333MHz RDIMMs at 1.35v **NOTE:** Total of 16 DIMM slots.
	Network Controller	One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
	Storage Controller	HP Smart Array P220i Controller with 512MB FBWC RAID 0,1
	Hard Drive	None ship standard Supports up to two (2) HP SFF hot-plug SAS/SATA/SDD drives
	Internal Storage	SAS: 2. 4TB; SATA: 2.0TB; SAS SSD: 1.6TB; SATA SSD: 1.6TB
	Optical Drive Bay	None
	Expansion Slots	2 standard - Slot 1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards.
	Management	HP iLO Management Engine (standard) Optional: HP iLO Scale-Out or HP Insight Control
	Form Factor	Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure
	Warranty	Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

HP ProLiant BL465c Gen8 6344 1P 16GB-R P220i Server 708931-B21	**Processor(s)**	(1) AMD Opteron™ 6344 (2.6GHz/12-core/16MB/115W) Processor
	Cache Memory	16MB Level 3 cache memory
	Memory	16GB (2 x 8 GB) DDR3 1333MHz RDIMMs at 1.35v **NOTE:** Total of 16 DIMM slots.
	Network Controller	One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
	Storage Controller	HP Smart Array P220i Controller with 512MB FBWC RAID 0,1
	Hard Drive	None ship standard Supports up to two (2) HP SFF hot-plug SAS/SATA/SDD drives
	Internal Storage	SAS: 2.4TB; SATA: 2.0TB; SAS SSD: 1.6TB; SATA SSD: 1.6TB
	Optical Drive Bay	None
	Expansion Slots	2 standard - Slot1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards.
	Management	HP iLO Management Engine (standard) Optional: HP iLO Scale-Out or HP Insight Control
	Form Factor	Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure
	Warranty	Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

Smart Buys

HP ProLiant BL465c Gen8 6220 2P 64GB-R P220i Server/S-Buy
696173-S01

Processor(s)	(2) AMD Opteron™ 6220 (3.0GHz/8-core/16MB/115W) Processor
Cache Memory	16MB Level 3 cache memory
Memory	64GB (8 x 8 GB) DDR3 1600MHz RDIMMs at 1.5v **NOTE:** Total of 16 DIMM slots.
Network Controller	One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
Storage Controller	HP Smart Array P220i Controller with 512MB FBWC RAID 0,1
Hard Drive	None ship standard Supports up to two (2) HP SFF hot-plug SAS/SATA/SDD drives
Internal Storage	SAS: 2.0TB; SATA: 2.0TB; SAS SSD: 1.6TB; SATA SSD: 800GB
Optical Drive Bay	None
Expansion Slots	2 standard - Slot1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards.
Management	HP iLO Management Engine (standard) Optional: HP Insight Control
Form Factor	Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure
Warranty	Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

HP ProLiant BL465c Gen8 6278 2P 64GB-R P220i Server/S-Buy
696172-S01

Processor(s)	(2) AMD Opteron™ 6278 (2.4GHz/16-core/16MB/115W) Processor
Cache Memory	16MB Level 3 cache memory
Memory	64GB (8 x 8 GB) DDR3 1600MHz RDIMMs at 1.5v **NOTE:** Total of 16 DIMM slots.
Network Controller	One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
Storage Controller	HP Smart Array P220i Controller with 512MB FBWC RAID 0,1
Hard Drive	None ship standard Supports up to two (2) HP SFF hot-plug SAS/SATA/SDD drives
Internal Storage	SAS: 2.0TB; SATA: 2.0TB; SAS SSD: 1.6TB; SATA SSD: 800GB
Optical Drive Bay	None
Expansion Slots	2 standard - Slot1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards.
Management	HP iLO Management Engine (standard) Optional: HP Insight Control
Form Factor	Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure
Warranty	Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

Smart Buys

HP ProLiant BL465c Gen8 6320 2P 64GB-R P220i Server/S-Buy 709114-S01	**Processor(s)**	(2) AMD Opteron™ 6320 (2.8GHz/8-core/16MB/115W) Processor
	Cache Memory	16MB Level 3 cache memory
	Memory	64GB (8 x 8 GB) DDR3 1600MHz RDIMMs at 1.5v **NOTE:** Total of 16 DIMM slots.
	Network Controller	One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
	Storage Controller	HP Smart Array P220i Controller with 512MB FBWC RAID 0,1
	Hard Drive	None ship standard Supports up to two (2) HP SFF hot-plug SAS/SATA/SDD drives
	Internal Storage	SAS: 2.0TB; SATA: 2.0TB; SAS SSD: 1.6TB; SATA SSD: 800GB
	Optical Drive Bay	None
	Expansion Slots	2 standard - Slot1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards.
	Management	HP iLO Management Engine (standard) Optional: HP Insight Control
	Form Factor	Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure
	Warranty	Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

HP ProLiant BL465c Gen8 6378 2P 64GB-R P220i Server/S-Buy 709113-S01	**Processor(s)**	(2) AMD Opteron™ 6378 (2.4GHz 16-core/16MB/115W) Processor
	Cache Memory	16MB Level 3 cache memory
	Memory	64GB (8 x 8 GB) DDR3 1600MHz RDIMMs at 1.5v **NOTE:** Total of 16 DIMM slots.
	Network Controller	One (1) HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM
	Storage Controller	HP Smart Array P220i Controller with 512MB FBWC RAID 0,1
	Hard Drive	None ship standard Supports up to two (2) HP SFF hot-plug SAS/SATA/SDD drives
	Internal Storage	SAS: 2.0TB; SATA: 2.0TB; SAS SSD: 1.6TB; SATA SSD: 800GB
	Optical Drive Bay	None
	Expansion Slots	2 standard - Slot1 supports Type A mezzanine Cards. Slot 2 supports Type A and Type B mezzanine cards.
	Management	HP iLO Management Engine (standard) Optional: HP Insight Control
	Form Factor	Up to eight (8) half-height blades supported in the HP BladeSystem c3000 Enclosure Up to sixteen (16) half-height blades supported in HP BladeSystem c7000 Enclosure
	Warranty	Server warranty includes 3 year Parts, 3 year Labor, 3-year on-site support.

Configuration Information - Factory Integrated Models

NOTE: This section lists some of the steps required to configure a Factory Integrated Model (configure-to-order or CTO server). To ensure only valid configurations are ordered, HP recommends the use of an HP approved configurator. Contact your local sales representative for information on CTO product offerings and requirements.
NOTE: Configure-to-order server blades must start with a CTO Blade Server.
NOTE: FIO indicates that this option is only available as a factory installable option.

Step 1: Base Server Blade Configuration (Select a configurable Blade)

HP Models	HP ProLiant BL465c Gen8 10Gb FlexibleLOM Configure-to-order Blade Server	634975-B21

Configurable Model ships with:

One (1) FlexibleLOM connector providing a choice of supported 10Gb FlexibleLOMs (see Step 2)
One (1) HP Smart Array P220i Controller with 512MB FBWC and RAID 0 and 1 support
Two (2) HP small form factor hot-plug SAS/SATA/SSD hard drive bays
One (1) x8 PCIe I/O expansion slot (Type A)
One (1) x16 PCIe I/O expansion slot (Type A or Type B)
One (1) integrated USB connector and one (1) Micro SDHC connector
One (1) TPM connector
HP iLO Management Engine (standard)

Step 2: Choose Required Options (one of the following from each list unless otherwise noted)

HP Processors   **For single processor configuration choose:**

Core Processor Option Kits
NOTE: The BL465c Gen8 supports one or two processors.
NOTE: All configure-to-order processor kits (i.e. xxxxxx-L21) contain one (1) processor.
NOTE: If two processors are desired, select one xxxxxx-L21 here in Step 2 and one xxxxxx-B21 in Step 3.
NOTE: All processors within the server must be identical.
NOTE: The letters "HE" following the model number denotes lower wattage.
NOTE: The processor model as well as the memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.

Sixteen-Core Processors

HP BL465c Gen8 AMD Opteron™ 6380 (2.5GHz/16-core/16MB/115W) FIO Processor Kit	699048-L21
HP BL465c Gen8 AMD Opteron™ 6378 (2.4GHz/16-core/16MB/115W) FIO Processor Kit	699049-L21
HP BL465c Gen8 AMD Opteron™ 6376 (2.3GHz/16-core/16MB/115W) FIO Processor Kit	699050-L21
HP BL465c Gen8 AMD Opteron™ 6366HE (1.8GHz/16-core/16MB/85W) FIO Processor Kit	699056-L21

Twelve-Core Processors

HP BL465c Gen8 AMD Opteron™ 6348 (2.8GHz/12-core/16MB/115W) FIO Processor Kit	699051-L21
HP BL465c Gen8 AMD Opteron™ 6344 (2.6GHz/12-core/16MB/115W) FIO Processor Kit	699052-L21

Eight-Core Processors

HP BL465c Gen8 AMD Opteron™ 6328 (3.2GHz/8-core/16MB/115W) FIO Processor Kit	699053-L21
HP BL465c Gen8 AMD Opteron™ 6320 (2.8GHz/8-core/16MB/115W) FIO Processor Kit	699054-L21

Configuration Information - Factory Integrated Models

	Quad-Core Processors	
	HP BL465c Gen8 AMD Opteron™ 6308 (3.5GHz/4-core/16MB/115W) FIO Processor Kit	699055-L21

HP Memory	**NOTE:** To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html (Worldwide) **NOTE:** HP memory from previous generation servers are not fully compatible with Smart Memory features in Gen8 Servers. **NOTE:** A minimum of one DIMM per processor is required. **NOTE:** For additional memory rules and guidelines, see the "Memory" section later in this document.	
	HP SmartMemory	
	Registered DIMMs (RDIMMs)	
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647871-B21
	HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647873-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	695793-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647877-B21
	HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647879-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647883-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	672633-B21
	Load Reduced DIMMs (LRDIMMs)	
	HP 32GB (1x32GB) Quad Rank x4 PC3L-10600L (DDR3-1333) Load Reduced CAS-9 Low Voltage Memory Kit	647885-B21
	Ultra Low Voltage DIMMs (ULVDIMM) for AMD Servers	
	HP 4GB (1x4GB) Single Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647869-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647875-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647881-B21
	NOTE: Depending on the memory configuration and processor model, 1600MHz and 1333MHz memory may operate at a lower speed. Please see the see the "Memory" section later in this document and the Online Memory Configuration Tool for details at www.hp.com/go/ddr3memory-configurator.	

HP Networking	**FlexibleLOM Adapters**	

Configuration Information - Factory Integrated Models

NOTE: The server requires one FlexibleLOM that is installed in the FlexibleLOM connector. All FlexibleLOMs are dual port: One port is routed to interconnect module bay 1 and the other to bay 2.

10Gb FlexibleLOM Adapters

HP FlexFabric 10Gb 2-port 554FLB FIO Adapter	684212-B21
HP Ethernet 10Gb 2-port 560FLB FIO Adapter	684214-B21
HP Flex-10 10Gb 2-port 530FLB FIO Adapter	684211-B21

NOTE: HP ProLiant BL465c Gen8 10Gb FlexibleLOM Configure-to-order Blade Server (634975-B21) must be selected in order to select one of the 10Gb FlexibleLOM adapters.

NOTE: Please see the QuickSpecs for Technical Specifications and additional information: www.hp.com/go/ProLiantNICs

Step 3: Choose Additional Factory Integration Options

HP Insight Software	HP Insight Control including 1yr 24x7 Support ProLiant ML/DL/BL-bundle Single Server FIO License	C6N36A
Converged Infrastructure Management Software	**HP OneView with iLO Advanced - Server hardware required on same purchase order**	
	HP OneView incl 3yr 24x7 Supp Bundle 1 Svr E-LTU	E5Y43AAE
	HP OneView for Blade Server incl 3yr 24x7 Supp FIO Bundle Physical 1 Svr Lic	F6Q89A
	HP OneView for Blade Server incl 3yr 24x7 Supp FIO Bundle 1 Svr E-LTU	F6Q89AAE
HP Storage Blades	HP D2220sb Configure-to-order Storage Blade	QW918A

Step 4: Choose Additional Options for Factory Integration

NOTE: For additional options, please refer to the "Core Options" and "Additional Options" section below. For additional options, including server blade enclosures interconnect, mezzanine options and power subsystem options; please see the Core Options and Additional sections below; or the following:

- HP BladeSystem c3000 Enclosure QuickSpecs:
  http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html
  NOTE: The c3000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c7000 Enclosure QuickSpecs:
  http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html
  NOTE: The c7000 HP c-Class enclosures have full backwards and forwards compatibility, existing server blades are supported in the new enclosures and any future server blades will be supported in the existing enclosures.
- HP BladeSystem c-Class Interconnect and Mezzanine Components:
  http://h18004.www1.hp.com/products/blades/components/c-class-interconnects.html and
  http://h18004.www1.hp.com/products/blades/components/c-class-adapters.html

Core Options

HP Networking	**10Gb Ethernet Mezzanine**

NOTE: Each 10 Gigabit Ethernet adapter requires a minimum of 2GB of server memory.

NOTE: A 10 Gigabit Ethernet adapter supports linking at 1Gbps or 10Gbps when connected to an interconnect module with 10Gb Ethernet downlinks.

NOTE: A 10 Gigabit Ethernet adapter supports linking at only 1Gbps when connected to an interconnect module with 1Gb Ethernet downlinks.

NOTE: The 10 Gigabit Ethernet adapters on each server blade connects to a 10Gb interconnect in bays 3-8 (HP BladeSystem c7000 Enclosure) or bays 2-4 (HP BladeSystem c3000 Enclosure).

HP Flex-10 10Gb 2-port 530M Adapter   631884-B21
NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14217_na/14217_na.html.

HP Flex-10 10Gb 2-port 552M Adapter   674764-B21
NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14218_na/14218_na.html.

HP FlexFabric 10Gb 2-port 554M Adapter   647590-B21
NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14221_na/14221_na.html.

HP Ethernet 10Gb 2-port 560M Adapter   665246-B21

1Gb Ethernet Mezzanine

HP Ethernet 1Gb 4-port 366M Adapter   615729-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14335_na/14335_na.html

FlexibleLOM Adapters
NOTE: The server supports one FlexibleLOM that is installed in the FlexibleLOM connector and is already included in Pre-configured Models and added per Step 2 for Factory Integrated Models. The FlexibleLOM options below are used to change these original FlexibleLOMs.

10Gb FlexibleLOM

HP Flex-10 10Gb 2-port 530FLB Adapter   656590-B21
NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14216_na/14216_na.html.

HP FlexFabric 10Gb 2-port 554FLB Adapter   647586-B21
NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14219_na/14219_na.html.

HP Ethernet 10Gb 2-port 560FLB Adapter   655639-B21
NOTE: Please see QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14331_na/14331_na.html.

Core Options

HP Fibre Channel	HP LPe1205A 8Gb Fibre Channel Host Bus Adapter for BladeSystem c-Class	659818-B21
	NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14338_na/14338_na.html	
	HP QMH2572 8Gb Fibre Channel Host Bus Adapter for BladeSystem c-Class	651281-B21
	NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14230_na/14230_na.html	
	HP QMH2672 16Gb Fibre Channel Host Bus Adapter	710608-B21
	NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14622_na/14622_na.html	

HP Processors	**NOTE:** The BL465c Gen8 supports one or two processors.	
	NOTE: All processors within the server must be identical.	
	NOTE: The letters "HE" following the model number denotes lower wattage.	
	NOTE: The memory configuration determines the maximum speed memory can operate. Please see the see the "Memory" section later in this document.	
	Sixteen-Core Processors	
	HP BL465c Gen8 AMD Opteron™ 6380 (2.5GHz/16-core/16MB/115W) Processor Kit	699048-B21
	HP BL465c Gen8 AMD Opteron™ 6378 (2.4GHz/16-core/16MB/115W) Processor Kit	699049-B21
	HP BL465c Gen8 AMD Opteron™ 6376 (2.3GHz/16-core/16MB/115W) Processor Kit	699050-B21
	HP BL465c Gen8 AMD Opteron™ 6366HE (1.8GHz/16-core/16MB/85W) Processor Kit	699056-B21
	HP BL465c Gen8 AMD Opteron™ 6278 (2.4GHz/16-core/16MB/115W) Processor Kit	686868-B21
	HP BL465c Gen8 AMD Opteron™ 6276 (2.3GHz/16-core/16MB/115W) Processor Kit	634970-B21
	HP BL465c Gen8 AMD Opteron™ 6274 (2.2GHz/16-core/16MB/115W) Processor Kit	660080-B21
	HP BL465c Gen8 AMD Opteron™ 6272 (2.1GHz/16-core/16MB/115W) Processor Kit	634973-B21
	HP BL465c Gen8 AMD Opteron™ 6262HE (1.6GHz/16-core/16MB/85W) Processor Kit	686870-B21
	Twelve-Core Processors	
	HP BL465c Gen8 AMD Opteron™ 6348 (2.8GHz/12-core/16MB/115W) Processor Kit	699051-B21
	HP BL465c Gen8 AMD Opteron™ 6344 (2.6GHz/12-core/16MB/115W) Processor Kit	699052-B21
	HP BL465c Gen8 AMD Opteron™ 6238 (2.6GHz/12-core/16MB/115W) Processor Kit	634978-B21
	HP BL465c Gen8 AMD Opteron™ 6234 (2.4GHz/12-core/16MB/115W) Processor Kit	660081-B21
	Eight-Core Processors	
	HP BL465c Gen8 AMD Opteron™ 6328 (3.2GHz/8-core/16MB/115W) Processor Kit	699053-B21
	HP BL465c Gen8 AMD Opteron™ 6320 (2.8GHz/8-core/16MB/115W) Processor Kit	699054-B21
	HP BL465c Gen8 AMD Opteron™ 6220 (3.0GHz/8-core/16MB/115W) Processor Kit	634983-B21
	HP BL465c Gen8 AMD Opteron™ 6212 (2.6GHz/8-core/16MB/115W) Processor Kit	660079-B21
	Quad-Core Processors	
	HP BL465c Gen8 AMD Opteron™ 6308 (3.5GHz/4-core/16MB/115W) Processor Kit	699055-B21
	HP BL465c Gen8 AMD Opteron™ 6204 (3.3GHz/4-core/16MB/115W) Processor Kit	686869-B21

Core Options

HP Memory	
	NOTE: To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at: http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html (Worldwide)
	NOTE: HP memory from previous generation servers are not fully compatible with Smart Memory features in Gen8 Servers.
	NOTE: A minimum of one DIMM per processor is required.
	NOTE: For additional memory rules and guidelines, see the "Memory" section later in this document.

HP SmartMemory

Registered DIMMs (RDIMMs)

HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647871-B21
HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647873-B21
HP 8GB (1x8GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	695793-B21
HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647877-B21
HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647879-B21
HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647883-B21
HP 16GB (1x16GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	672633-B21

Load Reduced DIMMs (LRDIMMs)

HP 32GB (1x32GB) Quad Rank x4 PC3L-10600L (DDR3-1333) Load Reduced CAS-9 Low Voltage Memory Kit	647885-B21

Ultra Low Voltage DIMMs (ULVDIMM) for AMD Servers

HP 4GB (1x4GB) Single Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647869-B21
HP 8GB (1x8GB) Dual Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647875-B21
HP 16GB (1x16GB) Dual Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647881-B21

NOTE: Depending on the memory configuration, 1600MHz and 1333MHz memory may operate at a lower speed. Please see the see the "Memory" section later in this document and the Online Memory Configuration Tool for details at: www.hp.com/go/ddr3memory-configurator.

HP Hard Drives	
	NOTE: The ProLiant BL465c Gen8 server includes the new HP hot-plug small form factor (SFF) SmartDrive carrier for enhanced management and reduced maintenance errors. HP drives from previous generation servers are not compatible with the BL465c Gen8 drive bays.
	NOTE: The mixing of standard SAS drives with SAS SSD drives is supported within the

Core Options

server, but limits the RAID configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported.
NOTE: HP hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.
NOTE: The hard drive options are not required when configuring a drive-less model.
NOTE: Server supports only 3G SATA devices. The 6G SATA drives will negotiate to 3G speeds.

6G SATA Value Endurance Hot Plug SFF (2.5-inch) Enterprise Boot Solid State Drives

HP 120GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Boot 3yr Wty Solid State Drive **NOTE:** This drive supports Gen8 servers only.	717965-B21
HP 80GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Boot 3yr Wty Solid State Drive **NOTE:** This drive supports Gen8 servers only.	734360-B21

6G SATA Value Endurance Hot Plug SFF (2.5-inch) Enterprise Value Solid State Drives

HP 800GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive **NOTE:** This drive supports Gen8 servers only.	717973-B21
HP 600GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Boot 3yr Wty Solid State Drive	739898-B21
HP 480GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive **NOTE:** This drive supports Gen8 servers only.	717971-B21
HP 300GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Boot 3yr Wty Solid State Drive	739888-B21
HP 240GB 6G SATA Value Endurance SFF 2.5-in SC Enterprise Value 3yr Wty Solid State Drive **NOTE:** This drive supports Gen8 servers only.	717969-B21

NOTE: Please see the QuickSpecs for technical specifications and information at: http://h18000.www1.hp.com/products/quickspecs/14038_na/14038_na.html.

6G SATA Hot Plug with SmartDrive SFF (2.5-inch) Midline (MDL) Drives

HP 1TB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655710-B21
HP 500GB 6G SATA 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	655708-B21

NOTE: Please see the QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/13021_na/13021_na.html.

SAS Hot Plug with SmartDrive SFF (2.5-inch) Enterprise Drives

HP 1.2TB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	697574-B21
HP 1.2TB 6G SAS 10K rpm SFF (2.5-inch) SC Dual Port Enterprise 3yr Warranty Hard Drive	718162-B21
HP 900GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652589-B21
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652583-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652572-B21
HP 300GB 6G SAS 10K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652564-B21
HP 300GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652611-B21

Core Options

HP 146GB 6G SAS 15K rpm SFF (2.5-inch) SC Enterprise 3yr Warranty Hard Drive	652605-B21

SAS Hot Plug SmartDrive SFF (2.5-inch) Midline Drives

HP 1TB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652749-B21
HP 500GB 6G SAS 7.2K rpm SFF (2.5-inch) SC Midline 1yr Warranty Hard Drive	652745-B21

NOTE: Please see QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/12244_na/12244_na.html.

6G SAS ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drive

HP 800GB 6G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	690829-B21
HP 400GB 6G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	690827-B21
HP 200GB 6G SAS Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	690825-B21

6G SATA ME Hot Plug SFF (2.5-inch) Enterprise Mainstream Solid State Drives

HP 800GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691868-B21
HP 400GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691866-B21
HP 200GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691864-B21
HP 100GB 6G SATA Mainstream Endurance SFF 2.5-in SC Enterprise Mainstream 3yr Wty Solid State Drive	691862-B21

NOTE: Servers supports only 3G SATA drives. The 6G SATA drives will negotiate to 3G speeds.

NOTE: The mixing of standard SAS drives with SAS SSD drives is supported within the server, but limits the RAID configuration to two separate RAID 0 volumes. Mixing of other drives types is not supported.

NOTE: Please see the QuickSpecs for technical specifications and information at: http://h18000.www1.hp.com/products/quickspecs/14038_na/14038_na.html.

6G SAS SLC Hot Plug SFF (2.5-inch) Enterprise Performance Solid State Drives

HP 400GB 6G SAS SLC SFF (2.5-inch) SC Enterprise Performance 3yr Warranty Solid State Drive	653082-B21
HP 200GB 6G SAS SLC SFF (2.5-inch) SC Enterprise Performance 3yr Warranty Solid State Drive	653078-B21

NOTE: Please see the QuickSpecs for technical specifications and information at: http://h18000.www1.hp.com/products/quickspecs/14038_na/14038_na.html.

Additional Options

HP Insight software	**HP Insight Control**	
	HP Insight Control including 1yr 24x7 Technical Support and Updates Single Server License	C6N27A
	HP Insight Control Server Provisioning Media Kit	BD883A
	HP Insight Management Media Kit	C6N31A

NOTE: HP Insight Management Media Kit contains DVDs without licenses. Contains HP Systems Insight Manager, HP Insight Control, HP Matrix Operating Environment, and Virtual Connect Enterprise Manager software. Uses an integrated installer to perform quick and accurate software installation and updates.

NOTE: Electronic and Flexible-Quantity licenses can be used to purchase multiple licenses with a single activation key.

NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.

NOTE: Licenses ship without media. The HP Insight Management Media Kit can be ordered separately, or can be downloaded at: http://www.hp.com/go/insightupdates.

NOTE: For additional license kits, please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12631_na/12631_na.html

HP iLO Advanced License HP Integrated Lights-Out (iLO) Advanced for ProLiant BladeSystem

HP iLO Advanced for BladeSystem including 1yr 24x7 Support Single Server License	512488-B21
HP iLO Advanced for BladeSystem including 1yr 24x7 Support Eight Server License	512489-B21

HP Integrated Lights-Out (iLO)

HP iLO Scale Out

HP Integrated Lights-Out Scale-Out 3yr 24x7 Tech Support and Updates Flex Quantity License	BD776A
HP Integrated Lights-Out Scale-Out 1yr 24x7 Tech Support and Updates Flex Quantity License	BD778A
HP Integrated Lights-Out Scale-Out including 3yr 24x7 Tech Support and Updates Flex Qty E-LTU	BD776AAE
HP Integrated Lights-Out Scale-Out including 1yr 24x7 Tech Support and Updates Flex Qty E-LTU	BD778AAE
HP Integrated Lights-Out Scale-Out including 3yr 24x7 Tech Support and Updates Tracking License	BD777A
HP Integrated Lights-Out Scale-Out including 1yr 24x7 Tech Support and Updates Tracking License	BD779A

NOTE: Customer will receive a license entitlement certificate, which must be redeemed online or via fax in order to obtain the license activation key(s). Includes one year of 24 x 7 HP Software Technical Support Service.
NOTE: For additional license kits, including electronic delivery options, please see the iLO QuickSpecs at http://www.hp.com/go/iLO

Additional Options

Converged Infrastructure Management Software	**HP OneView**	
	HP OneView with iLO Advanced	
	HP OneView incl 3yr 24x7 Supp Phys 1 Svr Lic	E5Y34A
	HP OneView incl 3yr 24x7 Supp Flex Qty E-LTU	E5Y35AAE
	HP OneView Media Kit Phys No Lic	E5Y37A
	HP OneView without iLO Advanced	
	HP OneView w/o iLO Adv incl 3yr 24x7 Supp Phys 1 Svr Lic	E5Y38A
	HP OneView w/o iLO Adv inc 3yr 24x7 Supp Flex Qty E-LTU	E5Y39AAE

NOTE: For additional license kits please see the QuickSpecs at http://h18004.www1.hp.com/products/quickspecs/14621_na/14621_na.html.

High Performance Clusters	**HP Cluster Management Utility**	
	HP Insight Cluster Management Utility 1yr 24x7 Flexible License	QL803B
	HP Insight Cluster Management Utility 3yr 24x7 Flexible License	BD476A

NOTE: These part numbers can be used to purchase one certificate for multiple licenses and support with a single activation key. Each license is for one node (server). Customer will receive a printed end user license agreement and license entitlement certificate via physical shipment. The license entitlement certificate must be redeemed online in order to obtain a license key. Customer also will receive a support agreement.

	HP Insight Cluster Management Utility Media	BD477A

NOTE: For additional license kits please see the QuickSpecs at: http://h18004.www1.hp.com/products/quickspecs/12612_na/12612_na.html.

HP I/O Accelerator Options	HP 1.2TB Multi Level Cell IO Accelerator for BladeSystem c-Class	QK763A
	HP 785GB Multi Level Cell IO Accelerator for BladeSystem c-Class	QK762A
	HP 365GB Multi Level Cell IO Accelerator for BladeSystem c-Class	QK761A

HP Security	HP Trusted Platform Module Option	488069-B21

NOTE: The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline.
NOTE: For more information about TPM, including a white paper, go to http://www.hp.com/go/TPM.
NOTE: ProLiant OS pre-installed units will come with the partition required for TPM deployment.
NOTE: The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.

Additional Options

HP Storage Controllers	**HP Smart Array P731m Controller**	
	HP Smart Array P731m/2GB FBWC 6Gb 4-ports Ext Mezzanine SAS Controller	698535-B21
	HP Smart Array P731m/512 FBWC 6Gb 4-ports Ext Mezzanine SAS Controller	698536-B21

NOTE: This option is a Type B mezzanine and is only supported on mezzanine slot 2.
NOTE: Please see the QuickSpecs for Technical Specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14626_na/14626_na.html.
(Smart Array P731m Controller)

	HP Smart Array P721m Controller	
	HP Smart Array P721m/2G FBWC 4-ports Ext Mezzanine SAS Controller	650072-B21
	HP Smart Array P721m/512 4-ports Ext Mezzanine SAS Controller	655636-B21

NOTE: This option is a Type B mezzanine and is only supported on mezzanine slot 2.
NOTE: Please see the QuickSpecs for Technical Specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/14404_na/14404_na.html.
(Smart Array P721m Controller)

HP InfiniBand Mezzanines

NOTE: When an InfiniBand adapter is installed in mezzanine slot 1, only one port is active (regardless of operating mode). When installed in any other mezzanine slot, both ports are active.
NOTE: On PCIe 2.0 based servers like BL465 Gen8, InfiniBand FDR speeds are not feasible.
NOTE: InfiniBand QDR and FDR speeds are only supported on the HP BladeSystem c7000 Enclosure. For additional information, please see the HP BladeSystem c7000 Enclosure and InfiniBand QuickSpecs at:
http://h18004.www1.hp.com/products/quickspecs/12586_na/12586_na.html
http://h18000.www1.hp.com/products/quickspecs/13078_na/13078_na.html

	HP Infiniband QDR/Ethernet 10Gb 2-port 544M Adapter	644160-B21

NOTE: The QDR InfiniBand adapter may be installed in any mezzanine slot of the server.

	HP Infiniband FDR/Ethernet 10Gb/40Gb 2-port 544M Adapter	644161-B22

NOTE: The FDR InfiniBand adapter must be installed in mezzanine slot 1 for FDR mode and may be installed in any mezzanine slot if operated in any other mode.

	HP InfiniBand FDR 2-port 545M Adapter	702213-B21

HP Ultrium Tape Blades	HP StoreEver LTO-4 Ultrium SB1760c Tape Blade	AQ697B

NOTE: LTO-4 Ultrium tape technology.

	HP StoreEver LTO-5 Ultrium SB3000c Tape Blade	BS580B

NOTE: LTO-5 Ultrium tape technology.

NOTE: For the above Ultrium tape drives, please see the QuickSpecs for technical specifications and additional information at:
http://h18000.www1.hp.com/products/quickspecs/12729_na/12729_na.html

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QuickSpecs

Additional Options

HP Storage Blades	HP D2200sb PCIe Storage Blade	AP880A
	NOTE: Please see the QuickSpecs for technical specifications and additional information at: http://h18006.www1.hp.com/storage/bladesystem/index.html.	
	HP D2220sb PCIe and StoreVirtual VSA Bundle	QW914A
	HP D2220sb PCIe w/(12) 900 GB 6G SAS HDD Bundle	QW915A
	HP D2220sb Build-to-order Storage Blade	QW917A
	NOTE: For additional information, please see the QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/14507_na/14507_na.html	
HP Expansion Blade	HP BLc PCI Expansion Blade	448018-B21
	NOTE: The PCI Expansion Blade provides PCI card slots for an adjacent c-Class Server Blade. Order one PCI expansion Blade for each server blade needing standard PCI-X or PCIe expansion slots.	
	NOTE: Ships with one pre-installed PCI-X connect board. Also includes one PCIe connect board which requires installation.	
	NOTE: Please see the QuickSpecs for technical specifications and additional information at: http://h18000.www1.hp.com/products/quickspecs/12753_na/12753_na.html	
HP Flash Media Kits for USB Drives	**HP Flash Media Kits for USB Drives**	
	HP 2GB USB Flash Media Drive Key Kit	608447-B21
	NOTE: HP qualified blank USB key for use with HP ProLiant servers that support the VMware virtualization. HP recommends this industry standard USB flash device for use with VMware ESXi. USB device must be installed in the internal slot of the ProLiant server for use with VMware ESXi. Refer to HP VMware Getting Started Guide for installation instructions.	
	HP Enterprise Mainstream Flash Media Kits for Memory Cards	
	HP 8GB USB Enterprise Mainstream Flash Media Drive Key Kit	737953-B21
	HP 8GB microSD Enterprise Mainstream Flash Media Kit	726116-B21
	HP 32GB microSD Enterprise Mainstream Flash Media Kit	700139-B21
	NOTE: Please see the QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/13971_na/13971_na.html	

Additional Options

HP Care Pack Services	**Proactive Care -** Collaborative Support plus Proactive services delivered by the on shore/near shore Advanced Solution Center (ASC) and backed by the global delivery organization, end-to-end case ownership from a Technical Solution Specialists and Technical Account Manager who remotely delivers firmware/software revision management, proactive scans and incident trend reports. Recommended for customers running a virtualized infrastructure and/or customers who desire an enhanced call support experience.	
	HP 3 year 6hr Call To Repair 24x7 with Defective Media Retention ProLiant BL4xxc Proactive Care SVC	U3B23E
	HP 3 year 4 hour 24x7 ProLiant BL4xxc Proactive Care Service	U3B14E
	HP 3 year 4 hour 24x7 with Defective Media Retention ProLiant BL4xxc Proactive Care Service	U3B17E
	HP 3 year 6 hour Call To Repair 24x7 ProLiant BL4xxc Proactive Care Service	U3B20E
	Proactive Care Personalized Support Environmental Option - to add an onsite Account Support Manager (ASM) to Proactive Care. ASM is an assigned resource who delivers support planning and brings technical expertise and best practices advice for the customer's environment.	
	HP 3 year ISS ProactiveCare Personalized Support	U6W98E
	Installation Services - reduce the time required to get your system up and running and help minimize disruptions to your business.	
	HP Install c-Class Server Blade Service	UE493E
	HP Hardware Installation during Non Standard Hours c-Class Server Blade Service	UG869E
	NOTE: Additional HP Care Pack services can be found at: http://www.hp.com/go/cpc	

Memory

For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool:
www.hp.com/go/ddr3memory-configurator

Memory Subsystem Architecture

The memory subsystem in this server blade is divided into four memory channels that support two DIMMs each for a total of eight (8) DIMM per installed processor or a grand total of sixteen (16) DIMMs for the server. Up to 32GB capacity DIMMs are supported for 512GB of memory (16 DIMM slots x 32GB per DIMM).

Memory Population Rules and Guidelines:

- A minimum of one DIMM per processor is required.
- Install DIMMs only if the corresponding processor is installed.
- If only one processor is installed in a two processor system, only half of the DIMM slots are available.
- To maximize performance, it is recommended to balance the total memory capacity between all installed processors and to load the channels similarly whenever possible.
- RDIMMs operating at either 1.35V or 1.5V may be mixed in any order, but the system will power them at the higher voltage.
- RDIMMs and LRDIMMs cannot be mixed.
- DIMMs of different speeds may be mixed in any order; the server will select a common optimal speed.
- The maximum memory speed is a function of the memory type, memory configuration, and processor model.
- The maximum memory capacity is a function of the memory type and number of installed processors.
- HP memory from previous generation servers is not compatible with the BL465c Gen8 Server Blade.
- To realize the performance memory capabilities listed in this document, HP SmartMemory is required. For additional information, please see the HP SmartMemory QuickSpecs at:
  http://h18000.www1.hp.com/products/quickspecs/14225_na/14225_na.html.
- For memory population rules and additional memory guidelines, please see the BL465c Gen8 user guide at
  http://www.hp.com/support.

NOTE: Mixing 1.25V and 1.5V DIMMs is not allowed. Mixing DIMMs with different voltage levels will result in the higher voltage level being used resulting in higher power consumption.

BL465c Gen8 Supported Memory Bandwidth								
DIMM Type		Registered DIMMS (RDIMMs)						Load Reduced (LRDIMMs)
DIMM Rank	Single Rank (1R)		Dual Rank (2R)	Single Rank (1R)	Dual Rank (2R)	Dual Rank (2R)	Dual Rank (2R)	Quad Rank (4R)
DIMM Capacity	4GB	4GB	8GB	8GB	8GB	16GB	16GB	32GB
DIMM Native Speed (MHz)	1333	1600	1333	1600	1600	1333	1600	1066
Voltage[1]	LV/ULV	Std	LV/ULV	Std	Std	LV/ULV	Std	LV
[1]ULV= low voltage at 1.25V; LV= low voltage at 1.35V; Std = standard voltage at 1.5V.								
SLOTS THAT CAN BE POPULATED								
16 slot servers	16	16	16	16	16	16	16	16
MAXIMUM CAPACITY (GB)[1]								
16 slot servers	64	64	128	128	128	256	256	512

Memory

POPULATED DIMM SPEED (MHz)								
1 DIMM Per Channel	1333	1600	1333	1600	1600	1333	1600	1333
2 DIMM Per Channel	1333	1600	1333/1066[2]	1600	1600	1333/1066[2]	1600	1333

[1] Maximum capacity will vary based on individual server platform.
[2] Ultra Low Voltage 8GB and 16GB dual rank operate at 1066MT/s speed in 2 DPC configurations.
NOTE: Maximum memory speed is a function of the processor bus speed; see the table below "Memory Speed by Processor Model".

Memory Speed by Processor Model

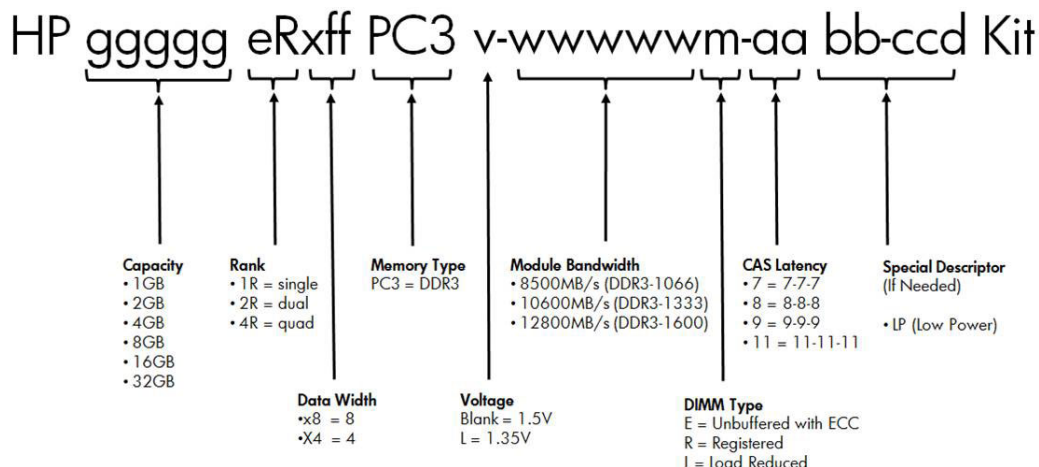| Processor Models	Supported Memory Speeds
AMD Opteron™ 6300 or 6200 Series processors	1600/1333/1066MHz

Standard and Maximum Memory Capacity (Pre-configured Models)

Pre Configured Models	Standard Memory	Maximum Memory Plus Optional Memory	Standard Memory Replaced with Optional Memory
AMD Opteron 6238, 6272, 6276, 6328, 6344, 6380	16GB (2x 8GB)	192GB (8x 8GB + 8x 16GB)	512GB (16x 32GB)

NOTE: Capacity references are rounded to the common gigabyte (GB) values.

- 2GB = 2,048MB
- 4GB = 4,096MB
- 8GB = 8,192MB
- 16GB = 16,384MB
- 32GB = 32,768MB

Memory options part number decoder

HP ggggg eRxff PC3 v-wwwwwm-aa bb-ccd Kit

Capacity
- 1GB
- 2GB
- 4GB
- 8GB
- 16GB
- 32GB

Rank
- 1R = single
- 2R = dual
- 4R = quad

Data Width
- x8 = 8
- X4 = 4

Memory Type
PC3 = DDR3

Voltage
Blank = 1.5V
L = 1.35V

Module Bandwidth
- 8500MB/s (DDR3-1066)
- 10600MB/s (DDR3-1333)
- 12800MB/s (DDR3-1600)

DIMM Type
E = Unbuffered with ECC
R = Registered
L = Load Reduced

CAS Latency
- 7 = 7-7-7
- 8 = 8-8-8
- 9 = 9-9-9
- 11 = 11-11-11

Special Descriptor
(If Needed)
- LP (Low Power)

Memory

Following are memory options available from HP:

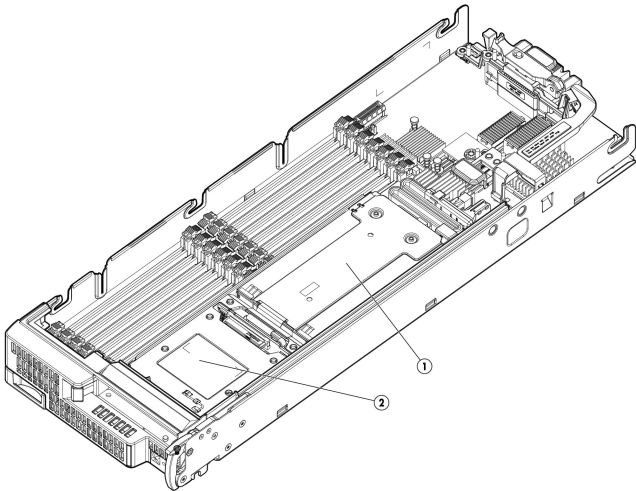| HP Memory	HP SmartMemory	
	Registered DIMMs (RDIMMs)	
	HP 16GB (1x16GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647883-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647881-B21
	HP 16GB (1x16GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	672633-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	695793-B21
	HP 8GB (1x8GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647879-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647877-B21
	HP 8GB (1x8GB) Dual Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647875-B21
	HP 4GB (1x4GB) Single Rank x4 PC3-12800R (DDR3-1600) Registered CAS-11 Memory Kit	647873-B21
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647871-B21
	HP 4GB (1x4GB) Single Rank x4 PC3U-10600R (DDR3-1333) Registered CAS-9 Ultra Low Voltage Memory Kit	647869-B21
	Load Reduced DIMMs (LRDIMMs)	
	HP 32GB (1x32GB) Quad Rank x4 PC3L-10600L (DDR3-1333) Load Reduced CAS-9 Low Voltage Memory Kit	647885-B21

NOTE: Depending on the memory configuration, 1600MHz and 1333MHz memory may operate at a lower speed. Please see the Online Memory Configuration Tool for details at www.hp.com/go/ddr3memory-configurator

Storage

1-2   2 x SFF hot-plug SAS, SATA, SAS SDD, and SATA SSD hard drives

Maximum Internal Storage

Hot Plug SFF SAS	2.0TB	2 x 1.0TB
Hot Plug SFF SATA	2.0TB	2 x 1.0TB
Hot Plug SFF SAS SSD	1.6TB	2 x 800GB
Hot Plug SFF SATA SSD	1.6TB	2 x 800GB

Technical Specifications

System Unit		
Dimensions (H x W x D) (with bezel)	7.11 x 2.18 x 20.37 in (18.07 x 5.54 x 51.76 cm)	
Weight (approximate)	Maximum: all processors, 16 DIMMs, hard drives, mezzanine cards, and two flash cache batteries installed)	14.00 lb (6.33 kg)
	Minimum: one processor and 2 DIMMs installed	10.50 lb (4.75 kg)
Power Specifications	For power specifications including input requirements, BTU rating, and power supply output, please see the:	

- HP BladeSystem c3000 Enclosure QuickSpecs at http://h18000.www1.hp.com/products/quickspecs/12790_na/12790_na.html.
- HP BladeSystem c7000 Enclosure QuickSpecs at http://h18000.www1.hp.com/products/quickspecs/12810_na/12810_na.html.

To review typical system power ratings use the HP Power Advisor which is available via the online tool located at: www.hp.com/go/hppoweradvisor.

System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 305 m (1.8°F per every 1,000 ft) above sea level to a maximum of 3,050 m (10,000 ft), no direct sustained sunlight.
		Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed.
		System performance may be reduced if operating with a fan fault or above 30°C (86°F).
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).
Relative Humidity (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.
	Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.
Altitude	Operating	3,050 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1,500 ft/min).
	Non-operating	9,144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1,500 ft/min).
Acoustic Noise	For acoustic noise specifications, please see the HP BladeSystem c-Class	

Technical Specifications

Enclosures QuickSpecs located at:
HP BladeSystem c3000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12790_na/
12790_na.html
HP BladeSystem c7000 Enclosure QuickSpecs:
http://h18000.www1.hp.com/products/quickspecs/12810_na/
12810_na.html

HP Smart Array P220i Controller		
	Disk Drive Interface	6Gb/s SAS (Serial Attached SCSI)
	Server Interface	x4 PCI Express host interface
	Cache Memory	512MB flash backed write cache (FBWC) cache standard
	Logical Drives Supported	64 (with included 512MB cache)
	Host Memory Addressing	64-bit, supporting servers memory space greater than 4GB
	RAID Support	RAID 1 (mirroring) and RAID 0 (striping)
	Other	Upgradeable firmware with recovery ROM Online drive flash (with SAS drives)

HP FlexFabric 10Gb 2-port 554FLB FlexibleLOM		
	Type	Integrated dual-port KR 10Gb FlexibleLOM with FlexFabric (Flex-10, FCoE, hardware-based iSCSI, iSCSI boot, TCP/IP offload engine, and autosensing 1Gb/10Gb Ethernet capability)
	Network Processor	Emulex BE3
	Data Transfer Method	x8 PCI Express 2.0
	Network Transfer Rate	Two ports, each at 20Gbps full duplex; 40Gbps aggregate full duplex theoretical bandwidth **NOTE:** Each port is autosensing 1Gb/10Gb, and can interoperate with 1Gb HP BladeSystem c-Class interconnect components. Both ports will operate at the same speed. **NOTE:** Each port on the 554FLB adapter transmits from the server at 20Gbps (theoretical) full duplex.
	IEEE Compliance	802.1p, 802.1q, 802.1qau, 802.3ad, 802.3ae, 802.3ap (10GBase-KX4) and 802.3x
	Standard Features	ProLiant Teaming including Network Fault Tolerance, Transmit Load Balancing, and Switch-Assisted Load Balancing 9K Jumbo frames (4K Jumbo frames when in FCoE mode) Microsoft Windows Receive Side Scaling (RSS) Hardware-based accelerated iSCSI iSCSI boot Flex-10 capability Fibre Channel over Ethernet (FCoE) TCP/IP offload engine (stateless TCP/IP) Autosensing 1Gb/10Gb Ethernet

Technical Specifications

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.